

Will Grapenthien

Completed



Original



```
#Will Grapenthien
#CS120 Project 2
def collage():
    setMediaPath()
    originalPic=makePicture("MyButterfly2.jpg")
    #explore(originalPic)
    noGreenPic=noGreen(originalPic)#function 1
    #show (noGreenPic)
    greyScalePic=grayScale(originalPic)#function 2
    #show (greyScalePic)
    sepiaTintPic=sepiaTint(originalPic)#function 3
    #show (sepiaTintPic)
    mirrorRightPic=mirrorRight(originalPic)#function 4
    #show (mirrorRightPic)
    edgeColorPic=edgeColor(originalPic)#function 5
    #show (edgeColorPic)
    flippedPic=flipped(originalPic) #function 6
    #show (flippedPic)
    edgePic=edge(originalPic) #function 7
    #show (edgePic)
    negativePic=negative(originalPic) #function 8
    #Copy
    canvas = makeEmptyPicture(getWidth(originalPic) * 3, getHeight(originalPic) * 3)
    startX=0; startY=0
    copy(mirrorRightPic, canvas, startX, startY)#1st copy
    startX= getWidth(mirrorRightPic)*2; startY= getHeight(greyScalePic)
    copy(noGreenPic, canvas, startX, startY)#2rd copy
    startX= getWidth(originalPic)*2; startY=0
```

```

copy(greyScalePic, canvas, startX, startY)#3rd copy
startX= 0; startY= getHeight(greyScalePic)
copy(sepiaTintPic, canvas, startX, startY)#4th copy
startX= getWidth(sepiaTintPic); startY= getHeight(greyScalePic)
copy(originalPic, canvas, startX, startY)#5th copy
startX= getWidth(originalPic); startY=0
copy(edgeColorPic, canvas, startX, startY) #6th copy
startX= 0; startY= getHeight(greyScalePic)*2
copy(flippedPic, canvas, startX, startY)#7th copy
startX= getWidth(flippedPic); startY= getHeight(greyScalePic)*2
copy(edgePic, canvas, startX, startY)#8th copy
startX= getWidth(flippedPic)*2; startY= getHeight(greyScalePic)*2
copy(negativePic, canvas, startX, startY)#9th copy
smallPic1=scaleDown(negativePic)
copy(smallPic1, canvas, 555, 410)
smallPic2=scaleDown(mirrorRightPic)
copy(smallPic2, canvas, 552, 170)
smallPic3=scaleDown(edgeColorPic)
copy(smallPic3, canvas, 238, 410)
smallPic4=scaleDown(edgePic)
copy(smallPic4, canvas, 230, 170)
cropedgeColor=crop(edgeColorPic,150,230,0,120)
cropnegative=crop(negativePic,150,230,0,120)
copy(cropedgeColor, canvas, 274, 286)
copy(cropnegative, canvas, 591, 286)
signature=makePicture("MySignature.jpg")
startX=getWidth(canvas)-getWidth(signature)
startY=0
chromakeySig(signature, canvas, startX, startY)
#explore(canvas)
show (canvas)
writePictureTo(canvas,r"C:\Users\michaelmk\Documents\cs120\project2\Will Grapenthien\Will GrapenthienP2.jpg")

```

```

def copy(pic,target,targX,targY):
    targetX = targX
    for x in range(getWidth(pic)):
        targetY = targY
        for y in range(getHeight(pic)):
            pixel = getPixel(pic,x,y)
            tx = getPixel(target,targetX,targetY)
            setColor(tx,getColor(pixel))
            targetY=targetY+1
        targetX = targetX+1

```

```

def crop(pic, startX, endX, startY, endY):

```

```

targetPic= makeEmptyPicture(endX - startX, endY - startY)
for sourceX in range(startX, endX):
    for sourceY in range(startY, endY):
        color = getColor(getPixelAt(pic, sourceX, sourceY))
        targetPx=getPixelAt(targetPic,sourceX -startX, sourceY - startY)
        setColor(targetPx, color)
return targetPic

def scaleDown(source):
    width=getWidth(source) /2
    height=getHeight(source)/2
    targetPic=makeEmptyPicture(width, height,white)
    sourceX = 0
    for targetX in range(0, int(getWidth(source) /2)):
        sourceY = 0
        for targetY in range(0, int(getHeight(source)) /2):
            sourcePx=getPixel(source, int(sourceX), int(sourceY))
            sourceColor=getColor(sourcePx)
            targetPx=getPixelAt(targetPic, targetX, targetY)
            setColor(targetPx, sourceColor)
            sourceY=sourceY+ 1.0/0.5
            sourceX=sourceX+ 1.0/0.5
    return targetPic

def negative(picture):
    newPic=duplicatePicture(picture)
    for x in range(0,getWidth(newPic)):
        for y in range(0,getHeight(newPic)):
            pixel = getPixel (newPic, x, y)
            red = getRed(pixel)
            green = getGreen(pixel)
            blue = getBlue(pixel)
            negColor = makeColor(255 - red, 255 - green, 255 - blue)
            setColor(pixel, negColor)
    return newPic

def edge(picture):
    newPic=duplicatePicture(picture)
    for px in getAllPixels(newPic):
        x = getX(px)
        y = getY(px)
        if y < getHeight(newPic) - 1 and x < getWidth(newPic) - 1:
            colorSum1 = getRed(px)+getGreen(px)+getBlue(px)
            pixelOverOne = getPixelAt(newPic, x+1, y+1)
            colorSumOverOne= getRed(pixelOverOne)+getGreen(pixelOverOne)+getBlue(pixelOverOne)

```

```

    colorDifference = abs(colorSumOverOne-colorSum1)
    newcolor = makeColor(colorDifference, colorDifference, colorDifference)
    setColor(px,newcolor )
return (newPic)

def flipped(picture):
    newPic=duplicatePicture(picture)
    width = getWidth(newPic)
    height = getHeight(newPic)
    for y in range(0, height/2):
        for x in range(0, width):
            sourcePixel = getPixel(newPic, x, y)
            targetPixel = getPixel(newPic, x, height - y - 1)
            color = getColor(sourcePixel)
            setColor(sourcePixel, getColor(targetPixel))
            setColor(targetPixel, color)
    return(newPic)

def edgeColor (pic):
    newPic=duplicatePicture(pic)
    for px in getPixels(newPic):
        x = getX(px)
        y = getY(px)
        if y < getHeight(newPic) - 1 and x < getWidth(newPic) - 1:
            colorSum = getRed(px)+getGreen(px)+getBlue(px)
            pixelOverOne = getPixel(newPic, x+1, y+1)
            colorSumOverOne= getRed(pixelOverOne)+getGreen(pixelOverOne)+getBlue(pixelOverOne)
            colorDifference = abs(colorSum-colorSumOverOne)
            if colorDifference < 10:
                setColor(px, black)
            elif colorDifference > 10 and colorDifference <40:
                setColor(px, blue)
            else:
                setColor(px,white)
    return (newPic)

def grayScale(picture):
    newPic = duplicatePicture(picture)
    for pixel in getAllPixels(newPic):
        newRed = getRed(pixel)*0.299
        newGreen = getGreen(pixel)*0.587
        newBlue = getBlue(pixel)* 0.114
        luminance = newRed+newGreen+newBlue
        setColor(pixel, makeColor(luminance,luminance,luminance))
    return newPic

```

```

def noGreen(picture):
    newPic = duplicatePicture(picture)
    for px in getAllPixels(newPic):
        value=getGreen(px)
        setGreen(px, value * 0)
    return newPic

def mirrorRight(source):
    newPic=duplicatePicture(source)
    mirrorPoint = getWidth(newPic) / 2
    width=getWidth(newPic)
    height = getHeight(newPic)
    for x in range(0, mirrorPoint):
        for y in range(0,height):
            rightPixel = getPixelAt(newPic,width-1-x, y)
            leftPixel = getPixelAt(newPic,x, y)
            rightColor = getColor(rightPixel)
            setColor(leftPixel,rightColor)
    return newPic

def sepiaTint(picture):
    newPic = duplicatePicture(picture)
    for px in getPixels(newPic):
        redValue = getRed(px)
        blueValue = getBlue(px)
        if (redValue < 63):
            redValue = redValue * 1.1
            blueValue = blueValue * 0.5
            setBlue(px, blueValue )
            setRed(px, redValue)
        if (redValue > 62 and redValue < 192):
            redValue = redValue * 1.2 #incraseing red by 20%
            blueValue = blueValue * 0.30
            setBlue(px, blueValue)
            setRed(px, redValue)
        if(redValue> 191):
            redValue = redValue * 1.08
            if (redValue > 255):
                redValue= 255
            blueValue = blueValue * 0.4
            setBlue(px, blueValue)
            setRed(px, redValue)
    return newPic

```

```
def chromakeySig(sourcePic, canvas, targetX, targetY):
    for sX in range(0, getWidth(sourcePic)):
        for sY in range(0, getHeight(sourcePic)):
            sPx = getPixelAt(sourcePic, sX, sY)
            sColor = getColor(sPx)
            targetPx = getPixelAt(canvas, sX + targetX, sY + targetY)
            if distance (black, sColor) < 180:
                setColor(targetPx, red)
```